Patent claims:

1. A bone substitute material comprising at least the following components:

a) a soft matrix,

b) living cells,

c) a setting matrix.

2. A bone substitute material as claimed in claim 1, wherein the soft matrix comprises fibrin or fibrinogen.

3. A bone substitute material as claimed in claim 2, wherein the soft matrix comprises thrombin.

4. A bone substitute material as claimed in claim 2 or 3, wherein the soft matrix comprises ε-aminocaproic acid or aprotinin.

5. A bone substitute material as claimed in any of the preceding claims, wherein the soft matrix comprises at least one substance which is selected from the group comprising chondroitin sulfate, proteoglycans, sialoproteins, growth factors, hormones and nucleic acids coding for growth factors or hormones.

6. A bone substitute material as claimed in any of the preceding claims, wherein the soft matrix comprises at least one substance selected from the group comprising biological collagen gel, gelatin, alginates, agarose, polysaccharides, synthetic collagen, hydrogels and viscous polymers.

7. A bone substitute material as claimed in any of the preceding claims, wherein at least one essential part of the living cells are osteoblasts or their precursor cells.

8. A bone substitute material as claimed in any of the preceding claims, which additionally comprises living angiogenic cells.

9. A bone substitute material as claimed in claim 8, wherein the angiogenic cells are endothelial cells or their precursor cells.

10. A bone substitute material as claimed in any of the preceding claims, wherein the setting matrix comprises at least one substance which binds together by crystallization to give hydroxyapatite.

11. A bone substitute material as claimed in any of the preceding claims, wherein the setting matrix comprises non-ceramic hydroxyapatite cement.

12. A bone substitute material as claimed in any of claims 1 to 10, wherein the setting matrix comprises PGLA.

13. A bone substitute material as claimed in any of the preceding claims, wherein the setting matrix solidifies within 15 minutes.

14. A bone substitute material as claimed in any of the preceding claims, wherein it is provided

in a multiple syringe consisting of a plurality of syringes which are combined, or

in a complete syringe with a plurality of chambers.

15. A process for producing a bone substitute material comprising a soft matrix, living cells and a setting matrix, which comprises the following features:

a) preparation of living cells,

b) mixing of the living cells with a composition which comprises constituents to form a soft matrix, and

c) mixing of the living cells with a composition

which comprises a setting material.

16. A process as claimed in claim 15, wherein initially the living cells are mixed with the composition which comprises constituents to form a soft matrix, and then the living cells embedded in the soft matrix are mixed with the composition which comprises a setting material.

17. A process as claimed in claim 15 or 16, wherein the living cells are obtained by a bone biopsy or bone marrow aspiration.

18. A process as claimed in any of claims 15 to 17, wherein the living cells are cultivated in vitro before step b) and c).

19. A process as claimed in any of claims 15 to 18, wherein at least part of the living cells are osteoblasts or their precursor cells.

20. A process as claimed in any of claims 15 to 19, wherein the soft matrix is produced by bringing a fibrinogen solution and a thrombin solution into contact.

21. A process as claimed in claim 20, wherein the fibrinogen is initially dissolved in osteoblast medium

or physiological saline (0.9% NaCl) or phosphate-buffered saline (PBS).

22. A process as claimed in claim 20 or 21, wherein the fibrinogen solution is stabilized by ε-aminocaproic acid.

23. A process as claimed in any of claims 15 to 22, wherein at least one substance selected from the group comprising chondroitin sulfate, proteoglycans, sialoproteins, growth factors, hormones and nucleic acids coding for growth factors or hormones is added to one of the compositions with which the living cells are mixed.

24. A process as claimed in one of claims 15 to 23, wherein at least one substance selected from the group comprising biological collagen gels, gelatin, alginates, agarose, polysaccharides, synthetic collagen, hydrogels and viscous polymers is added to one of the compositions with which the living cells are mixed.

25. A process as claimed in any of claims 15 to 24, wherein the setting matrix is produced by dissolving non-ceramic hydroxyapatite cement in an aqueous solution.

26. A process as claimed in any of claims 15 to 25, wherein the bone substitute material is provided

in a multicomponent applicator consisting of a plurality of containers, which may also be syringes, which are combined, or

into a complete syringe with a plurality of chambers.

27. The use of a non-ceramic hydroxyapatite cement for producing a cell-containing bone substitute material.

28. A device for preparing and administering a mixture comprising

a) a mixing chamber with an outlet opening through which the mixture can emerge,
b) a first supply channel (main channel) leading into the mixing chamber and
c) one or more other supply channels (subsidiary channels) leading into the mixing chamber,

where the end of the subsidiary channel/the ends of the subsidiary channels are arranged in the mixing chamber so that material entering the mixing chamber from the subsidiary channel/subsidiary channels can penetrate into the material stream entering the mixing chamber

from the main channel.

29. A device as claimed in claim 28, wherein the internal diameter of the main channel is at least 1 mm.

30. A device as claimed in claim 28 or 29, wherein the internal diameter of the subsidiary channel/subsidiary channels is not more than 1.5 mm.

31. A device as claimed in any of claims 28 to 30, which comprises 3 to 5 subsidiary channels.

32. A device as claimed in any of claims 28 to 31, wherein the ends of the subsidiary channels in the mixing chamber are arranged essentially symmetrically around the end of the main channel in the mixing chamber.

33. A device as claimed in any of claims 28 to 32, wherein the end of the subsidiary channel/the ends of the subsidiary channels in the mixing chamber intersect with the imaginary extension of the main channel in the mixing chamber.

34. A device as claimed in any of claims 28 to 33, wherein the supply channels are connected to storage containers from which the contents of the storage containers can be delivered into the supply channels.

35. A device as claimed in claim 34, wherein the storage containers are syringes.

36. A bone material as claimed in any of claims 1 to 13, which is provided in a device as claimed in any of claims 28 to 35.

37. A process as claimed in any of claims 15 to 25, wherein the bone substitute material is produced in a device as claimed in any of claims 28 to 35.